CLAIMS.

What is claimed is:

1. An ROV comprising a topside, a fish and an umbilical cable for connecting the topside and the fish together, wherein the fish is adapted to be powered by an onboard power supply, the cable has an outer skin and a control-signal carrying core, and the core of the umbilical cable has a diameter of less than 2mm along a substantial portion of the cable's length.

2. The ROV of claim 1, wherein the onboard power supply is in the form of a removable, water-sealed battery.

3. The ROV of claim 2, wherein the battery is fully electrically-insulated.

4. The ROV of claim 1, wherein non-contact coupling means are used to extract power from the power supply without any need for direct electrically conducting contact means between the power supply and its adjacent components.

5. The ROV of claim 4, wherein the coupling is by means of inductance coupling.

6. An umbilical cable for an ROV for carrying signals between a topside and a fish of the ROV, the umbilical cable comprising a control-signal carrying core and a buoyant skin that makes the umbilical cable buoyant.

7. The cable of claim 6, wherein the core has a diameter of less than 2mm along a substantial portion of the cable's length.

8. The cable of claim 6, wherein the diameter is about 1.2mm.

9. The cable of claim 6, wherein the core of the cable comprises a coaxial cable.

10. The cable of claim 6, wherein the core of the cable is surrounded by linear fibers of a high tensile strength, flexible material.

11. The cable of claim 6, wherein the core is formed of an optical fiber.

12. The cable of claim 6, wherein a hairy polypropylene braid surrounds the cable.

13. The cable of claim 6, having an outside diameter of one of: 2-10 mm, 3-9 mm, and 4-8 mm.

14. The ROV of claim 1, further comprising a buoyant umbilical cable attached thereto, the umbilical cable comprising a control-signal carrying core and a buoyant skin.

15. A battery for fitting in or onto and for powering an in- or an under-the-water, electrically operated device, wherein the battery is both fully water-sealed and, in use, fully electrically-insulated.

16. The battery of claim 15, wherein the power, in use, is coupled therefrom by inductance coupling means.

17. A fish for an ROV comprising a first camera mounted at the front of the fish and a second camera mounted in a periscope position.

18. The fish of claim 17, wherein the pan and tilt of at least one of the cameras is adjustable.

19. The fish of claim 17, wherein the second camera is fitted above the main body of the fish.

20. The fish of claim 17, wherein the second camera obtains a periscope view using a periscopic mirror arrangement.

21. The fish of claim 17, wherein the first camera is a color camera and the second camera is a monochrome camera.

22. A method of transferring power on an in- or an under-the-water, electrically operated device from a battery that is both fully water sealed and, in use, fully electrically insulated to a water and electrically sealed electric circuit in the device using non-electrical contact coupling means.

23. The method of claim 22, wherein the non-electrical contact coupling means is induction coupling on an induction core.

24. The method of claim 23, wherein the core is in two parts, one part of the core being provided in the battery and one part of the core being provided on the circuits.

25. The method of claim 24, wherein the core is a pair of E shaped members.

26. The method of claim 25, wherein a fixed power and a variable power are simultaneously transferred.

27. The method of claim 22 wherein the device is an fish of an ROV and power is transmitted from the battery to the fish through a part of the bulkhead of the fish.

28. The method of claim 22 and further comprising the transfer of data by non-electrical contact coupling means between a water and electrically sealed circuit in the device and a further water and electrically sealed circuit in an umbilical cable connected to the device.

29. The method of claim 25, wherein each E shaped member comprises twin opposed pairs of windings provided on outer limbs of the E shaped member and a third coil provided on a central limb of the member.

30. A topside for instructing a fish of an underwater ROV, the topside comprising a wireless handset and a computer unit, the computer unit, in use, being adapted to instruct the fish via an umbilical cable connected to the fish and the computer unit, and the wireless handset being adapted to transmit user defined instructions to the computer unit.

31. A fish for an ROV of the type having a umbilical cable connecting the fish to a topside, the fish being provided with twin, side-mounted, horizontal thrusters, wherein the fish is provided with a position for connecting the umbilical cable thereto at a location directly at or substantially above the mid-point of a line between the twin thrusters.

32. A waterproof cable connector for fitting within an aperture in a pressure wall, the connector having an outer sleeve of a size substantially corresponding to, but slightly smaller than, the size of the aperture, and an epoxy filled core supporting the cable to be extended through the pressure wall within the sleeve, the sleeve having two pressure resisting flanges thereon, one for engaging against an outer surface of the pressure wall adjacent the aperture, and one extending radially inwardly from the inner surface of the sleeve for resisting movement of the epoxy when under pressure.

33. The connector of claim 32, wherein the juncture between the epoxy and the second flange is provided by a pressure resistant planar barrier.

34. A fish for an ROV comprising a camera and a window for the camera, wherein the window is a dual layer window, the first layer, internal of the second window, being sealingly mounted over the camera lens to prevent, in use, water ingress to the camera, and the second layer being positioned over the first window, being adapted to allow flooding of the space between the two layers.

35. A pan and tilt mechanism for a camera comprising an arcuate drive bolt fixed relative to a chassis of the mechanism and a pivotable gimbal for mounting the camera thereon, wherein a lead nut mounted to the gimbal can be moved along the bolt to pivot the gimbal.

36. The mechanism of claim 35, wherein a potentiometer is operatively connected to the gimbal for detecting the angle about which the gimbal is pivoted.

37. A motor for an ROV thruster, the motor comprising a fixed stator having electromagnet coil windings on core fingers thereof about which is mounted a sealed rotor having permanent magnets and propellers, wherein water is free to circulate between the rotor and the stator.

38. An underwater communications device comprising a send and receive communications processor and a handset, wherein, using the handset, a short text message can be written and transmitted to the communications processor for sending out ultrasonically to a message recipient.

39. The underwater communications device of claim 38, wherein the communications processor is onboard a fish of an ROV.

40. The underwater communications device of claim 38, wherein two handsets are provided, each having a send and receive communications processor so that two divers can communicate with each other underwater.

41. A fish for an ROV fitted with an ultrasonic azimuth detecting system.

42. The fish of claim 41, wherein the azimuth detecting system has two transducers fitted to the fish and a transmitter located elsewhere, wherein by timing the time delay between receipt of an ultrasonic pulse from the transmitter to the transducers the azimuth of the fish can be calculated relative to the position of the transmitter.

43. A fish for an ROV comprising a release mechanism for an umbilical cable attachable thereto, the release mechanism being activatable remote from the mechanism.

44. The fish of claim 43, wherein the release mechanism is activatable by a user remote from the mechanism.

45. The fish of claim 43, wherein the release mechanism includes a logic circuit programmed to release it if, in use, the umbilical cable is snapped.

46. The fish of claim 43, wherein the release mechanism includes a spring mechanism for popping out the umbilical cable from the mechanism.

47. The fish of claim 43, wherein the release mechanism is operated by contraction of a shape memory alloy component.

48. The fish of claim 43, wherein the release mechanism comprises pins on the fish, the pins being engagable with a bayonet fitting on an end of the umbilical cable.

49. The fish of claim 48, wherein the pins are retractable to release the bayonet fitting from engagement with the fish.

50. The fish of claim 48, wherein the pins are mounted on a unlocking disk, the rotation of which disengages the pins from slots on the bayonet fitting.

51. A fish for an ROV, comprising a controller for detecting loss of data communication with the topside through an umbilical cable and in response thereto initiating a recovery procedure to return the fish to the topside.

52. The fish of claim 51, wherein the recovery procedure comprises a first phase of surfacing and a second phase of driving the fish to the topside using a radio communication link between the fish and the topside.

53. The fish of claim 52, wherein the fish comprises a global positioning system used during the second phase for controlling the driving of the fish to the topside.

54. The fish of claim 51, wherein the controller compiles a movement log of the fish during use and is operable to control the driving of the fish to the topside during the recovery procedure based on the movement log.

55. The fish of claim 51, wherein the fish comprises a cable release mechanism and the recovery procedure comprises actuating the cable release mechanism for disconnecting the umbilical cable.

56. A fish for an ROV, comprising:

a main body having a front end and a rear end, as well as a top side and a bottom side;

a vertical thruster arranged in a vent extending through the main body from the top side to the bottom side; and

a left and a right side thruster disposed towards the rear end of the main body on either side thereof, mounted by respective left and right rear arms that extend substantially sideways from the rear end of the main body, and respective left and right front arms that extend outwardly from the front end of the main body and then sweep back rearwardly to the center of the left and right side thrusters respectively.

57. The fish of claim 56, further comprising left and right lights arranged in forward parts of the left and right arms respectively.

58. The fish of claim 56, further comprising a dome window arranged in the front end of the main body behind which is arranged a camera.

59. The fish of claim 56, further comprising a periscope portion upstanding from the top side of the main body and having a periscope camera mounted therein.

60. The fish of claim 58, further comprising a periscope portion upstanding from the top side of the main body and having a periscope camera mounted therein.

61. The fish of claim 60, wherein the periscope portion extends upwards from a rearward portion of the vent on the top side of the main body.

62. The fish of claim 56, wherein the thrusters have flexible propellers arranged in Korts.

63. A hand controller for an ROV with left and right side thrusters and a vertical thruster, the hand controller comprising:

a handle portion shaped for gripping between the fingers and palm of either a left or a right hand; and

a first controller mounted for thumb actuation by the gripping left or right hand and configured to provide control signals for a left thruster and a right thruster of the ROV, thereby to control surge and yaw.

64. The hand controller of claim 63, wherein the first controller is further configured to provide control signals for a vertical thruster of the ROV, thereby to control heave.

65. The hand controller of claim 63, comprising a second controller mounted for index finger actuation by the gripping left or right hand and configured to provide control signals for a vertical thruster of the ROV, thereby to control heave.

66. The hand controller of claim 65, wherein the second controller comprises first and second actuation elements for initiating up and down heave motion.

67. The hand controller of claim 63, further comprising a wireless transmitter for transmitting the control signals to a control unit.

68. The hand controller of claim 63, wherein the first controller is a joystick.

69. The hand controller of claim 63, further comprising a camera controller mounted for actuation by another hand and configured to provide further control signals for panning and tilting a camera in the ROV.

70. The hand controller of claim 63, further comprising a light controller mounted for actuation by another hand and configured to provide further control signals for switching on and off at least one light in the ROV.